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A New Species of the Newly Recorded Genus *Larsia* (Insecta: Diptera: Chironomidae) from Japan

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Larsia miyagaseensis sp. nov. is described on the basis of the male and female adults, pupa, and larva. This is the first report of the genus *Larsia* from Japan.

Key Words: Chironomidae, Tanypodinae, *Larsia*, taxonomy, Japan.

Introduction

The genus *Larsia* belongs to the subfamily Tanypodinae and is represented by 12 described species: two species occurring in the Palaearctic Region, eight species in the Nearctic Region, one species in the Neotropical Region, and one species jointly in the Oriental and Australian Regions (Fittkau 1962; Sublette and Sublette 1973; Oliver *et al.* 1990; Ashe and Cranston 1991; Epler 1995; Hillman and Nielsen 1995). The genus is not so far known from Japan.

Among chironomid specimens collected from clear streams in Kanagawa and Fukushima Prefectures, I found a new species of *Larsia*. The adults, both male and female, of this species are entirely yellowish white in color and the male foretarsus has moderately long beards. These features are unique among the known species of the genus. Although the pupal plastron plate and corona are different in size between the specimens from the two localities, I could not find any morphological difference in adult males between the two populations. I conclude that these are conspecific and the pupal plastron plate and corona are variable in size between individuals. I give herein descriptions of the male and female adults and the immature forms, pupa and larva, of this new species on the basis of these specimens.

The holotype and paratypes are deposited in the Department of Biology, Faculty of Education, Shizuoka University, Japan.

The terminology for general morphology used in this paper follows Saether (1980).

Genus *Larsia* Fittkau, 1962

Larsia Fittkau, 1962: 339.

Type species: *Ablabesmyia atrocincta* Goetghebuer, 1942 by original designation.

Emended diagnosis. As in Fittkau (1962), Beck and Beck (1966), Roback (1971),

Saether (1977), Fittkau and Roback (1983), Fittkau and Murray (1986), and Murray and Fittkau (1989), with the following exceptions and additions:

Male foretarsus with or without long beards; claw lacking basal spine in some species. Hypopygium usually with setigerous tergite IX, but in some specimens tergite IX bare. Female abdominal segment X well developed, with fine setae in some species. Larval antenna with ring organ on apical 1/2–1/3 of basal segment; antennal ratio 2.5–4.5. Larval maxillary palp with ring organ on apical 1/2–1/5 of basal segment.

Remarks. A lyrate or semi-lyrate tibial spur occurs in adults of *Pentaneura*, *Trissopelopia*, *Larsia*, *Zavrelimyia*, *Paramerina*, *Hudsonimyia*, *Pentaneurella*, and *Reomyia* of the tribe Pentaneurini (Murray and Fittkau 1989). Among these genera, *Pentaneurella* and *Reomyia* as well as *Larsia* have a scutal tubercle on the thorax in the adult. *Larsia* is, however, distinct from *Pentaneurella* in having a hypopygium with a setigerous tergite IX and a conical anal point, and from *Reomyia* in lacking vein R_2 and having an indistinct tibial comb on the hind leg. Furthermore, *Larsia* resembles *Guttipelopia*, *Telmatopelopia*, *Zavrelimyia* and *Paramerina* in having an apical group of strong setae on the foretibia, but differs from them in having a scutal tubercle.

The pupae of *Larsia* are similar to those of *Zavrelimyia*, *Paramerina*, *Pentaneura*, *Trissopelopia*, and *Reomyia* in their thoracic horns with a corona and a plastron plate and their anal macrosetae with an adhesive sheath, but are generally separable from them by the rugged respiratory atrium in the thoracic horn except for a few species of *Zavrelimyia* and *Paramerina*, in which the distal portions of the respiratory atria are slightly rugged [reported by Fittkau (1962) in *Z. signatipennis* (Kieffer, 1924); Niitsuma (unpublished) in *Paramerina* sp.] .

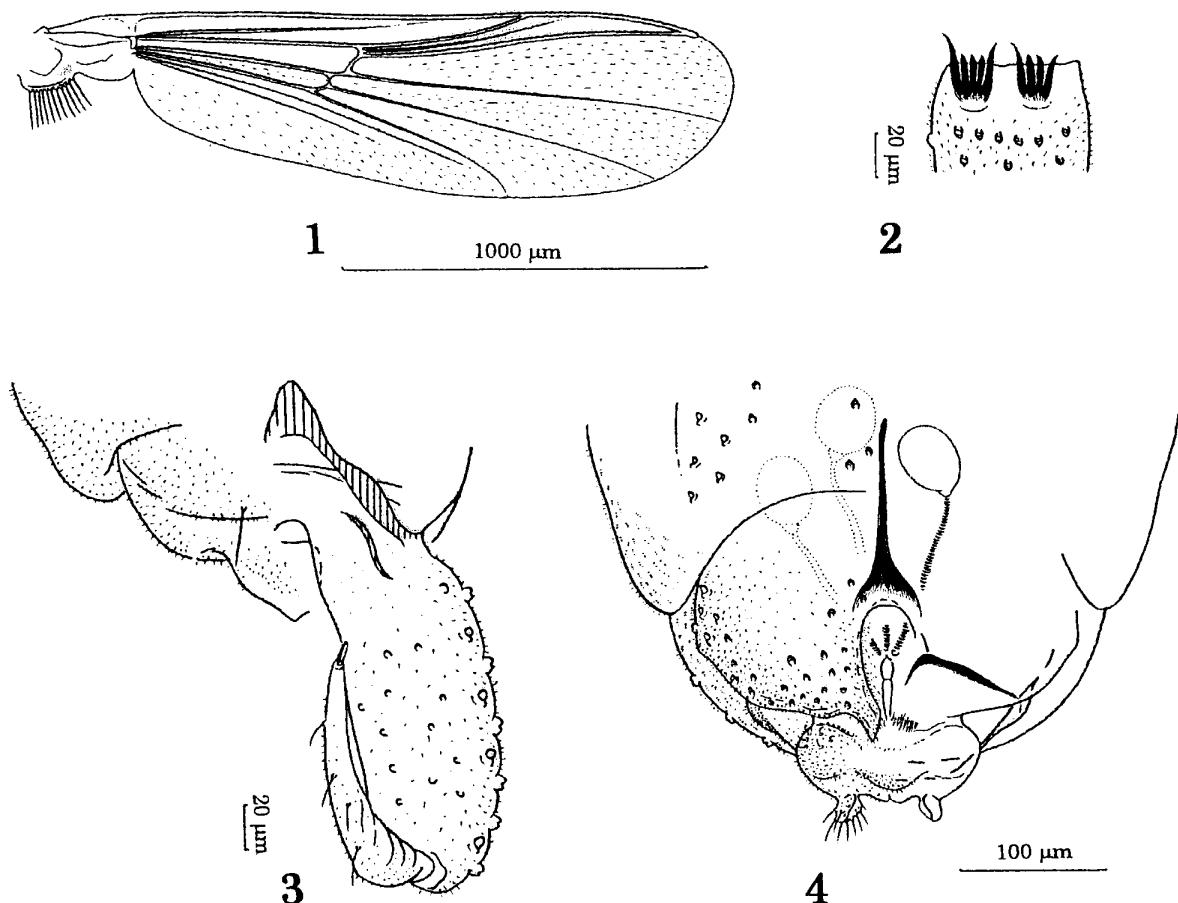
***Larsia miyagaseensis* sp. nov.**
(Figs 1–14)

Type material. Holotype: ♂, emerged in laboratory on 26.V.1993 from sample of bottom sediment collected from mountain stream in Miyagase, Kiyokawa Village, Kanagawa Prefecture (type locality), 21.V.1993, and mounted on glass slide in Canada Balsam with the associated pupal exuvium. Paratypes: 3♂♂, 2♀♀, with 4 pupal and 3 larval exuviae, 7 larvae, same data as for holotype (adults emerged on 27–30.V.1993); 1♂, same locality as holotype, 11.VI.1995 (adult emerged on 16.VI.1995); 1♂, same locality as holotype, 13.X.1996 (adult emerged on 10.XI.1996); 2♀♀, with 2 pupal and 1 larval exuviae, same locality as holotype, 8.VI.1997 (adults emerged on 11–15.VI.1997); 2♂♂, 1♀, with 3 pupal exuviae, upper reaches of Asami River in Hirono Town, Fukushima Prefecture, 19.VIII.1999 (adults emerged on 21–23.VIII.1999).

Description. Male. Body length 2.2–3.0 mm. Wing length 1.4–2.0 mm.

Coloration: Body entirely yellowish white; thorax, abdomen, and wings without any markings.

Head: Temporals 12–14, uniserial. Antenna with strong apical seta, 55–73 μ m long, about as long as terminal flagellomere; antennal ratio 1.10–1.38. Clypeus rounded, slightly longer than wide, with 9–15 setae. Lengths of palpal segments in Table 1.



Figs 1-4. Adults of *Larsia miyagaseensis* sp. nov. Male (holotype): 1, wing; 2, apex of hind tibia; 3, hypopygium (dorsal view). Female (paratype): 4, genitalia (ventral view).

Table 1. Lengths (μm) of palpal segments in *Larsia miyagaseensis* sp. nov.; means in parentheses.

n	Segment					
	I	II	III	IV	V	
Male	7	28-38 (32)	65-78 (71)	125-150 (134)	113-143 (124)	188-238 (213)
Female	4	30-35 (33)	60-63 (61)	100-120 (111)	95-120 (109)	138-175 (156)

Thorax: Antepronotum with fine dorsal seta on tubercle and 1-3 fine lateral setae on each side. Scutal tubercle distinct, 10-15 μm high. Acrostichals 25-33, irregularly biserial and evenly diverging in front of scutal tubercle; dorsocentrals 8-19, uniserial, but anteriorly biserial in some specimens; humerals 5-10; prealars 6-11; supraalar 1. Scutellum with transverse row of 6-11 long, posterior setae and group of 2-11 short, anterior setae. Wing (Fig. 1) with dense setae on membrane. Cross-vein RM beyond MCu; distance along M between RM and MCu/length of MCu 0.57-1.29; venarun ratio 0.86-0.92. Squama fringed with 10-20 setae. Legs with lyrate tibial spur (Fig. 2), lateral teeth of spur 6-7 in foreleg, 3-5 in middle and hind

Table 2. Lengths (μm) and ratios of leg segments in eight males of *Larsia miyagaseensis* sp. nov.; means in parentheses.

	Coxa	Trochanter	Femur	Tibia	Tarsomere 1
Fore leg	150–180 (163)	100–120 (113)	560–760 (645)	650–880 (738)	550–660 (589)
Middle leg	220–300 (254)	80–100 (86)	580–780 (684)	510–690 (601)	420–610 (516)
Hind leg	170–230 (201)	70–90 (79)	550–760 (643)	690–970 (814)	580–820 (700)
	Tarsomere 2	Tarsomere 3	Tarsomere 4	Tarsomere 5	Leg ratio*
Fore leg	330–390 (354)	220–270 (239)	140–180 (159)	90–110 (96)	0.75–0.85
Middle leg	160–230 (206)	110–150 (134)	75–100 (87)	60–80 (72)	0.82–0.92
Hind leg	290–410 (359)	190–290 (246)	120–180 (153)	80–100 (92)	0.80–0.89

* Ratio of length of tarsomere 1 to length of tibia.

legs; foretibia armed with apical group of 3–5 strong setae, these being 3.71–4.46 times as long as tibial diameter; tibial comb of hind leg altered into row of 5–7 long setae. Tarsal beard long; bristle ratio 5.43–7.10 in foreleg, 8.13–10.70 in middle leg, 6.00–8.13 in hind leg. All claws curved apically, pointed, and each with basoventral spine; pulvilli small but distinct. Lengths and ratios of leg segments in Table 2.

Hypopygium (Fig. 3): Tergite IX with 2–10 setae. Gonocoxite 130–158 μm long, 2.50–3.22 times as long as broad. Gonostylus slender, 83–105 μm long.

Female. Body length 1.5–1.7 mm. Wing length 1.4–1.5 mm.

Coloration: Similar to that of male.

Head: Temporals 11 in number. Antenna with strong apical seta, 55–60 μm long; terminal flagellomere slightly longer than preceding 2 flagellomeres together; antennal ratio 0.23–0.25. Clypeus with 13–17 setae. Lengths of palpal segments in Table 1.

Thorax: Antepronotum with 1 dorsal and 2–3 lateral setae on each side. Acrostichals 23–28 in number, dorsocentrals 12–25, humerals 11–20, prealars 7–8, supraalar 1. Scutellum with 9–11 long, posterior setae and 6–9 short, anterior setae. Wing with dense setae on membrane. Distance along M between RM and MCu/length of MCu 0.67–0.75; venarun ratio 0.85–0.90. Squama fringed with 8–14 setae. Legs with claws pointed apically. Lengths and ratios of leg segments in Table 3.

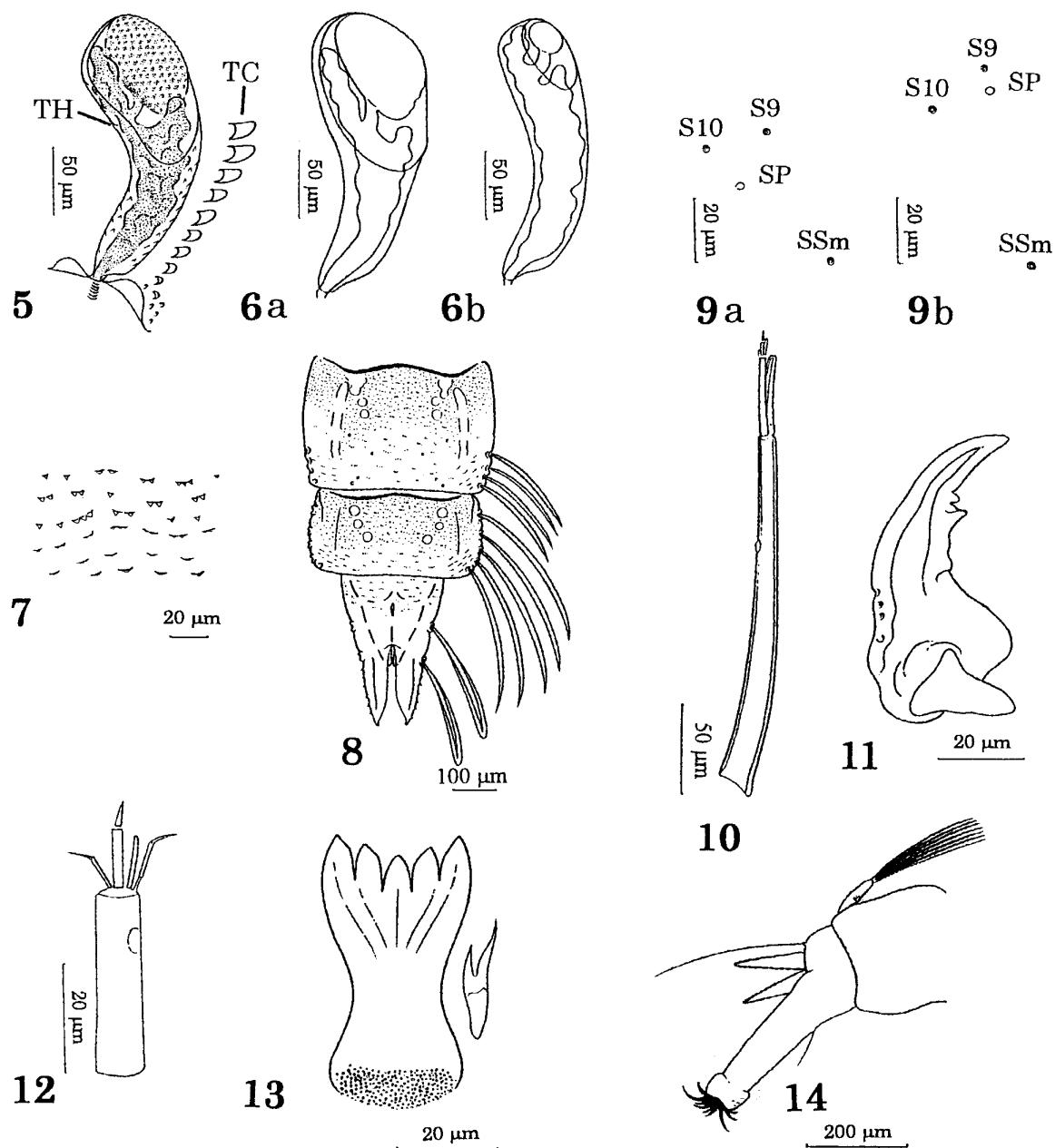
Genitalia (Fig. 4): Gonapophysis VIII triangular. Gonapophysis IX well developed; notum 95–100 μm long. Labium weakly fringed with fine setae. Seminal capsule pale, oval, 45–48 μm long and 38 μm wide. Segment X with 5–8 fine setae on each side. Postgenital plate triangular, rounded at apex.

Pupa. Body length 3.0–3.7 mm.

Coloration: Exuvium predominantly brown, each abdominal tergite pale posteriorly in some specimens.

Cephalothorax: Thoracic horn 173–223 μm long, 2.8–4.3 times as long as broad (Fig. 5). Corona and plastron plate rather variable in size; corona 0.27–0.61 times as long as length of horn, plastron plate 0.48–0.70 times as long as major axis of corona and 3.3–11.7 times as long as diameter of neck (Fig. 6a, b). Respiratory atrium slightly rugged. Thoracic comb composed of 10–13 rounded tubercles.

Abdomen: Shagreen spinules mostly arranged serially in groups of 2–4, these



Figs 5–14. Immature forms of *Larsia miyagaseensis* sp. nov. Pupal exuvium (holotype): 5, thoracic horn (TH) and comb (TC); 6a, b, variation of thoracic horn in paratypes from Kanagawa (a) and Fukushima (b) Prefectures; 7, shagreen spinules on abdominal tergite IV; 8, posterior abdominal segments (dorsal view, only right setae shown). Larva (paratype): 9a, b, variation of arrangements of seta submenti (SSm), ventral cephalic setae S9 and S10, and sensory pore (SP); 10, antenna; 11, mandible; 12, maxillary palp; 13, ligula and paraligula (only right paraligula shown); 14, posterior body segments (lateral view).

rows slightly arched (Fig. 7). Segment VII with 4 taeniate L-setae on distal 0.32–0.38 (Fig. 8). Male genital sac 0.61–0.65 times as long as anal lobe length.

Fourth instar. Body length 3.0–4.4 mm. Head capsule length 430–490 µm.

Coloration: Almost entirely white except apex of mandible, ligula, and claws of

Table 3. Lengths (μm) and ratios of leg segments in four females of *Larsia miyagaseensis* sp. nov.; means in parentheses.

	Coxa	Trochanter	Femur	Tibia	Tarsomere 1
Fore leg	140–160 (155)	90–110 (103)	520–600 (565)	620–700 (663)	450–510 (483)
Middle leg	230–270 (248)	70–90 (80)	610–690 (648)	550–630 (600)	420–460 (435)
Hind leg	170–210 (198)	80–90 (83)	560–620 (590)	700–800 (755)	500–580 (540)
	Tarsomere 2	Tarsomere 3	Tarsomere 4	Tarsomere 5	Leg ratio*
Fore leg	250–290 (268)	160–190 (178)	110–120 (115)	75–90 (83)	0.71–0.76
Middle leg	170–200 (185)	110–120 (115)	70–80 (75)	60–70 (66)	0.70–0.76
Hind leg	270–300 (285)	190–220 (203)	110–130 (123)	80–90 (88)	0.69–0.74

* Ratio of length of tarsomere 1 to length of tibia.

posterior parapod brown.

Head: Cephalic index 0.60–0.65. Ventral cephalic setae S9 and S10, and sensory pore arranged in triangle; 2 cephalic setae placed anteriorly to sensory pore, but S10 placed posteriorly to sensory pore in some specimens (Fig. 9a, b). Lengths of antennal segments I–IV 168–210, 45–55, 6–8, and 4–5 μm , respectively. Antennal ratio 2.5–3.5. Antennal segment I with ring organ on about distal third; blade and accessory blade about as long as segment II, 48–54 μm and 45–50 μm long, respectively (Fig. 10). Antennal segment II 9–11 times as long as wide; style extending beyond apex of segment III; Lauterborn organ about half as long as segment III. Mandible 73–88 μm long; basal tooth and accessory tooth distinct, relatively large (Fig. 11). Basal segment of maxillary palp 4.0–4.3 times as long as wide, with ring organ on distal 1/5–1/4 (Fig. 12). Ligula 1.9–2.2 times as long as maximum width, 58–65 μm long; teeth arranged concavely (Fig. 13). Paraligula bifid, 25–28 μm long; fork positioned 0.50–0.64 of way from base.

Body: Four anal tubules tapering to pointed apex (Fig. 14). Procercus about 4 times as long as wide, with 7 anal setae. Posterior parapod with 16 claws; small claws simple, but large claws partly serrated along both margins.

Distribution. Japan (Kanagawa and Fukushima Prefectures).

Etymology. From the type locality, Miyagase.

Remarks. This new species shares several somewhat eccentric characters with *Larsia canadensis* Bilyj, 1984: the pupal thoracic horn with a slightly rugged respiratory atrium, the larval antenna with a ring organ on about the apical third of the basal segment, the very low antennal ratio (less than 3.5 in some specimens), and the larval maxillary palp with a ring organ on the apical fifth or quarter of the basal segment. Adults of both species are similar to one another in having distinct pulvilli and no markings on the wing veins. But this new species is separable from *L. canadensis* by the entirely yellowish white body in both sexes, the long tarsal beards on the male foreleg, and the apically pointed claws with a basoventral spine. In *L. canadensis*, the male body is brown to fuscous on the scutal vittae and slightly infuscate on the hypopygium, the tarsal beard is absent from the male foreleg, and the claw is apically trifid, without a basoventral spine, according to Bilyj (1984).

Also *Larsia berneri* Beck and Beck, 1966 somewhat resembles this new species in the adult male without dark markings on the abdomen and wings, but differs from it in lacking pulvilli and tarsal beards on the male foreleg. The pupa of *L. berneri* may be separable from that of this new species by the respiratory atrium with many diverticula (Beck and Beck 1966).

Biological notes. This new species was collected from cold streams with water temperatures of 14–16°C in spring and autumn and at most 18°C in summer. The larvae live on fallen leaves submerged in the streams. The adults are found from spring to autumn, but their appearances are sporadic and uncommon. This species may be cold-stenothermal.

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